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Batik designs are made by pouring or brushing a liquid resist, such as melted paraffin, on some portions of the fabric and then soaking the whole in a dye-bath. The dye colours only the areas free of the resist. One or several colours can be used, or several shades of the same colour, or a combination of both.

This process, known even to the ancient Egyptians, has been used for centuries throughout southeast Asia, but it was perfected in Java.

The Javanese patterns are traditional. They are the heritage of many generations and are still used today. The patterns acquired special meanings in the past. Families and clans had their own patterns and colour combinations. The colours most frequently used were indigo, brown and brown-red.

In Java it is the women who pour the warm resist from thin-spouted metal cans onto the cloth in the manner required to obtain the desired pattern. Dyeing is considered a profession in itself and is done mostly by men.

Textiles in the western world are mass-produced. Many are quite beautiful. All are very impersonal.

Batik is not meant to compete with the machine. This ancient craft has been updated to open the creative field of textile design to all those who have the urge or the curiosity. As a result, it is now possible to create personal designs on textiles for garments or interiors. They have that certain human appeal which is discernible in all objects that show the hand of man in their manufacture.

## Setting Up A Class

The following considerations are important in setting up a class, and should determine the number of beginners that can be accommodated.

The size of the working area where students will apply the resist (tables are optional) should be large enough to allow each student to spread his material flat and to work without hindrance.

The number of electrical outlets and the type of wiring must be adequate. In order to give each student the opportunity to benefit fully from the class within the given time, there should be one outlet for each three students. Outlets are used not only for hot plates to melt the resist, but also to boil the dye and to heat the irons used to remove the resist.

Size and type of drying area must be determined beforehand. If the weather is favorable the batiks are left outside to dry. But in case of damp weather adequate drying areas are needed to provide enough air for the batiks to dry within a reasonable time. Basements, utility rooms or boiler rooms are suitable.

Access to running water is essential. A fair amount of water is used during the process — for the dye-baths, for the vinegar rinse, for the cold water rinse. To avoid having to carry the water to the working area, the dyeing and the rinsing should be done close to the water supply and the drain.

Additional space for drying the batiks after the Varsol rinse is also needed. This area should be well ventilated, preferably out of doors, and far from the part of the room where the hot plates are being used. (Boiler room unsuitable.)

Clothes lines (about 3 feet for each student) should be placed low to prevent the wet dye from splattering around. If no clothes pins are available, the clothes line should be covered with fresh paper each time before use. Usually after the line has been used, some of the wet dye remains on it. Unless protected with paper, the next batik will pick it up.



Check if spilled dye and crumbled resist can be easily cleaned off the floor. If not, place several layers of newspapers around the dye-bath and wherever necessary.

Students should be warned about these points:

Hang wet batiks of the same colour together, and leave spaces on the drying lines between batiks of different colours. One drop of dye may ruin the result of several hours' work.

Never smoke near the Varsol rinse

Disconnect hot plates and irons when not in use.

Keep the area around the hot plates uncluttered.

Never heat the resist over direct fire.

Do first stage of resist removal over a piece of newspaper and not directly on the floor.

Each student needs the following supplies:

one sheet of coloured construction paper, a brush and white poster paint to work out the design;

one square yard of unbleached cotton cloth, washed and pressed

one pound paraffin wax

textile dyes (one package is sufficient for 1 pound dry weight or 3 yards of material 42" wide.);

one small double boiler

one paint brush 2" wide

one pair rubber gloves

one quart of Varsol

two cups white vinegar

two teaspoons of rock salt

one mixing stick

one large flat-bottomed basin of at least 2 gallons' capacity. (For a group of people, one basin is needed for each colour of dye-bath. Glass, plastic, china, aluminum and stainless steel are recommended. Chipped enamelware and galvanized metalware are unsuitable, as they render the dye inactive upon contact. )

a good stack of newspapers

electric iron (dry) — steam irons are useless because vents get blocked during resist removal

one box of thumbtacks (optional)

one meat thermometer (optional)

wax paper (optional)



### Preparation of the Cloth

Spread several layers of wrapping paper or newspaper on a flat surface (floor, top of a table). Place the piece of new, washed and pressed cloth on top. Spread evenly. If you cover the newspaper layer with wax paper, it will prevent the cloth from sticking after the resist has been applied. If conditions allow, thumbtack 2 or all 4 edges of the material. When batiking on a larger scale (over 5' on all four sides), a frame is required.

### Preparation of the Resist

Melt the resist in a double boiler. If a thermometer is used, keep the resist on the heat until it indicates a temperature close to the higher limits of melting range. (See Appendix, p. 51). Without the thermometer, the desirable temperature can be determined by testing. Drop the resist on an expendable piece of material. If the resist has no milky rim around the edges, the required temperature has been reached. The proper temperature is essential for a successful batik. It is therefore important to watch for clouding of the resist during application. Periodical reheating is necessary unless the double boiler is left standing on the heating unit throughout the process.

### Preparation of the Dye-Bath

Follow the instructions on the label, but when increasing the volume of the dye-bath to the desired quantity, use cold instead of hot water. The dyeing process takes place in a cold dye-bath. Some colours of the "direct dye" variety are sensitive to this change in temperature and clotting or flaking of dye in solution may result. Though this does not necessarily affect the colour yield, such dyes are better used mixed with more stable ones, or avoided altogether. (See Appendix, page 51.)

### Application of the Resist

If guidelines are necessary, wax crayon or a greasy type of tracer is preferable to pencil.

The resist is applied with a brush. It should be submerged in the hot resist for several minutes so that the whole brush takes on the temperature of the resist.

When the brush is overloaded with resist, control over brush strokes becomes difficult as the resist tends to spill. Too little resist in the brush results in rapid cooling and insufficient penetration of the cloth.

The brush should be held at right angles to the cloth. Only slight pressure should be exerted on the handle so that the resist may flow freely.

The application of resist is not much like the application of paint, even though the tool is the same. It is practically impossible to correct the drawing and very nearly impossible to correct the colour. Each step is, in a sense, irrevocable. The process of working out the design on the cloth is actually the opposite of painting, in that each time the resist is applied, it is done to save some of the colour that is already there instead of adding colour with each brush stroke.

Depending on the design, the brush may be used full width, on the edge or corner. In free work, the brush is used to drip or splatter the resist over the surface of the cloth to form patterns. After the applied resist has cooled, the cloth is lifted from the working surface. The hot resist may stick the cloth to the newspaper beneath it. Remove as many of the paper bits as you can. However, fragments are easily removed at a later stage. Any marks left by underlying newspapers may also be removed later. This can be avoided by putting wax paper between the cloth and the newspapers.

## Dyeing Process

Do not forget to wear rubber gloves.

No matter what type of dye is involved, preliminary trials on small samples of the material to be used for the batik are recommended. Though dye uptake is usually instantaneous, it might be advisable to continue the submersion until full colour has developed. The dye fabric will be about two shades lighter than when wet.

In true batik styles a marble effect is obtained in the resisted areas. This effect is produced when the resisted cloth is moved about, shaken or pinched in the dye-bath so that fine cracks or veins appear in the resist.

After being removed from the dye-bath — without wringing or squeezing — the batik should be allowed to dry.

#### Further Treatment

Allow the batik to dry thoroughly. When direct dyes are used, the dried batik should be rinsed in two cups of white vinegar dissolved in approximately  $1\frac{1}{2}$  gallons of cold water. This rinse will increase the fastness of the dye. When drip dry, the batik may receive a final rinse in cold water. This final rinse in cold water is optional.

#### Removal of the Resist

- 1 Crack and break the thick layer of resist with your fingers. Rub the material between your hands as if you were carefully scrubbing a stain on a rather delicate type of fabric.
- 2 Press with a hot iron between several layers of newspaper.
- 3 Submerge in Varsol. Move around and work the resisted areas with your finger tips. As long as these feel slippery, there is still a resist deposit.
- 4 Allow to dry in a well ventilated area.
- 5 When thoroughly dry, the batik may receive another hot pressing between two layers of newspaper. If necessary, the Varsol rinse may be repeated.
- 6 Give the batik a final pressing when it is free of stains.



When making wall-hangings the resist removal in Varsol may be omitted. Thus the batik receives only one hot pressing— on its surface instead of between layers of newspapers. The melted resist saturates the cloth, adding depth to colours and stiffness to the fabric. Batik treated in such manner, when in need of cleaning, requires a rinse in Varsol to remove the old resist and, at the same time, the dirt residue. Clean resist should be ironed into the batik subsequently.



Fig. 1 - Resist (represented by the black areas) has been applied according to the design







Fig. 2 - The resisted cloth has received the dye-bath





Fig. 3 - After the resist has been removed—the parts covered during the dye-bath show the original colour of the cloth





Ideas for designs can be found everywhere. In things that grow—plants, flowers, trees. In things man-made—bottles, pots, tools. In the world of animals—birds, fish and insects, real or fantastic. In the universe of planets—stars, moons and suns. It may be one or a group of human figures, real or fantastic; shapes such as triangles, circles, squares; or simply clusters of lines and dots. No matter what the idea, the problems of making a design will always be basically similar.

Size is one important factor. It should be carefully considered in itself and in relation to the size of the cloth. If the entire surface is subdivided, then the size of the areas in relation to each other and in relation to the whole should be studied. Some designs gain in power by being larger, others gain in delicacy by being smaller.

The shapes of the parts of the design in relation to the shape of the design as a whole should provide variety. Shape is closely connected with size; when you repeat a shape, vary its size. Avoid repeating size and shape throughout the design.

The arrangement of the design on the cloth may be either symmetrical or asymmetrical.

1 When the centre of the design corresponds with the centre of the piece of cloth, the design is said to be symmetrical. It provokes a sensation of exact balance and harmony. Various symmetrical arrangements are illustrated on the following pages.

Full centre — Fig. 4

Full border — Fig. 5

Branching out horizontally and/or vertically — Fig. 6

Branching out diagonally — Fig. 7

2 When the centre of the design does not correspond with the centre of the piece of cloth, the design is said to be asymmetrical. Two or more elements have to be used for such a design to appear balanced and complete. Four asymmetrical arrangements are illustrated.

Horizontal and/or vertical division — Fig. 8

Diagonal division — Fig. 9

Two elements in off-centre balance — Fig. 10

Three or more elements in off-centre balance — Fig. 11

### Developing the Design

The road from the original idea to the final design is one of exploration and discovery. Many good designs have little to do with the initial idea that sparked them off.

To be successful, a design has to take full advantage of the medium used. It must suit the purpose for which it is designed, and it should be executed with apparent ease and spontaneity.

In light of these rules it becomes obvious that pictures executed in another medium (be it oil, watercolour, colour photography, print or shellcraft) would require a great deal of adjusting before they could be considered designs suited for batik work.

A design made with the designer's own resources, no matter how modest they may be, is invariably superior to one painstakingly (and perhaps clumsily) copied from the work of a professional. Moreover, to improvise on somebody else's effort is to deny oneself the unique experience of creating something that is entirely one's own.

### Batik as a Medium

The most distinguishing characteristic of batik is the system of lines or veins created by the penetration of the dyes through the cracks in the resist. This marble effect cannot be achieved by any other process and should therefore play an important role in the design.

As this marble effect tends to interfere with designs based on realistic treatment, it is preferable to choose designs without descriptive detail and shading. Use plain colours in flat areas. The colour areas will not remain immaculate especially when the cloth has received more than one dye-bath.



In designs involving only one dye-bath, the main preoccupation will be with the size, the shape and the arrangement.

When colours are selected for a design involving more than one dye-bath, it is necessary to consider the colours in terms of their interaction rather than separately. Like the instruments in an orchestra, each colour plays its own part, yet all parts are meaningfully tied together.

After a period of exploration, it should become clear that it is not the "ideal" colour in the mind of the designer that counts. We can isolate a colour in our mind, but with our eyes we always see several colours at once. Each colour has to be adjusted to produce the right effect when seen in the context of the completed work.

It is advantageous in the long run to begin with the three basic colours — yellow, blue and red — on a white cloth.

Overlapping these colours or mixing them in the dye-bath will soon produce numerous mixtures. Depending on the proportions, red mixed with yellow will produce orange-yellow, apricot, orange, peach, orange-red. Red mixed with blue will produce lavender, lilac, violet, purple, rose, pink. Blue mixed with yellow will produce chartreuse, apple green, nile green, leaf green, peacock blue, turquoise. Bluish or greenish shades mixed with red will produce browns, dull greens, fawn, cinnamon, maroon. Blue mixed with a little red and yellow should produce grey. Orange tinged with blue will produce gold.

However, keep in mind that there is no foolproof colour system and that good colouring still depends on the taste of the colourist.



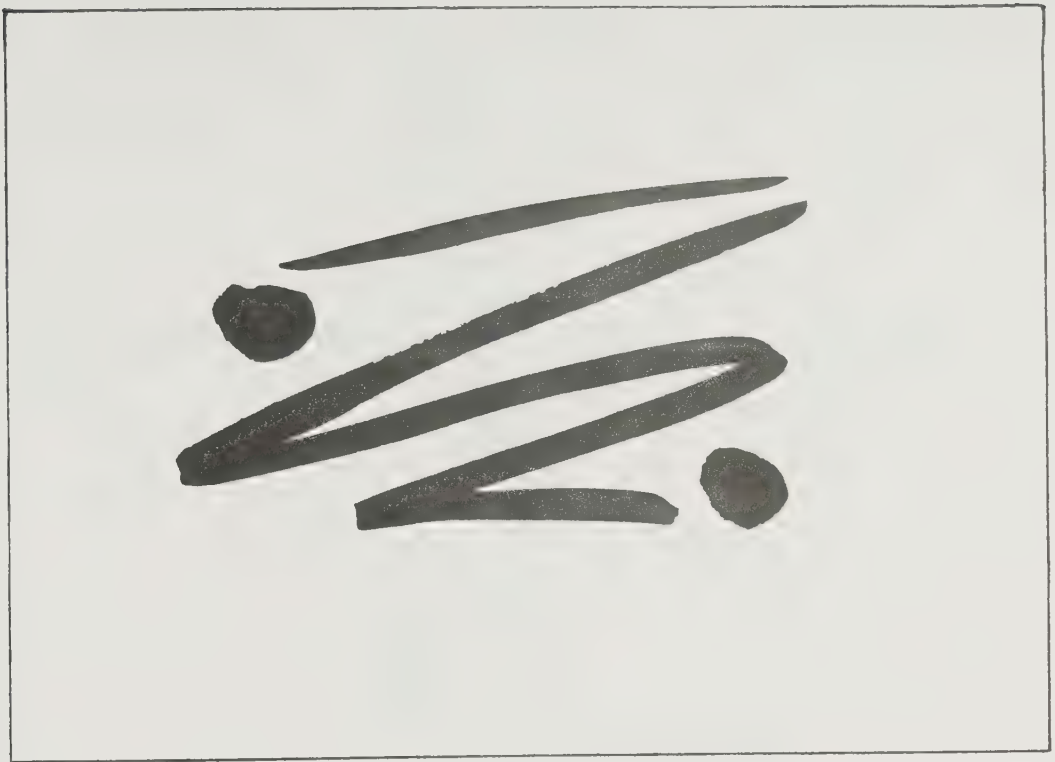


Fig. 4 - Full centre, free border



Fig. 5 - Full border, free centre





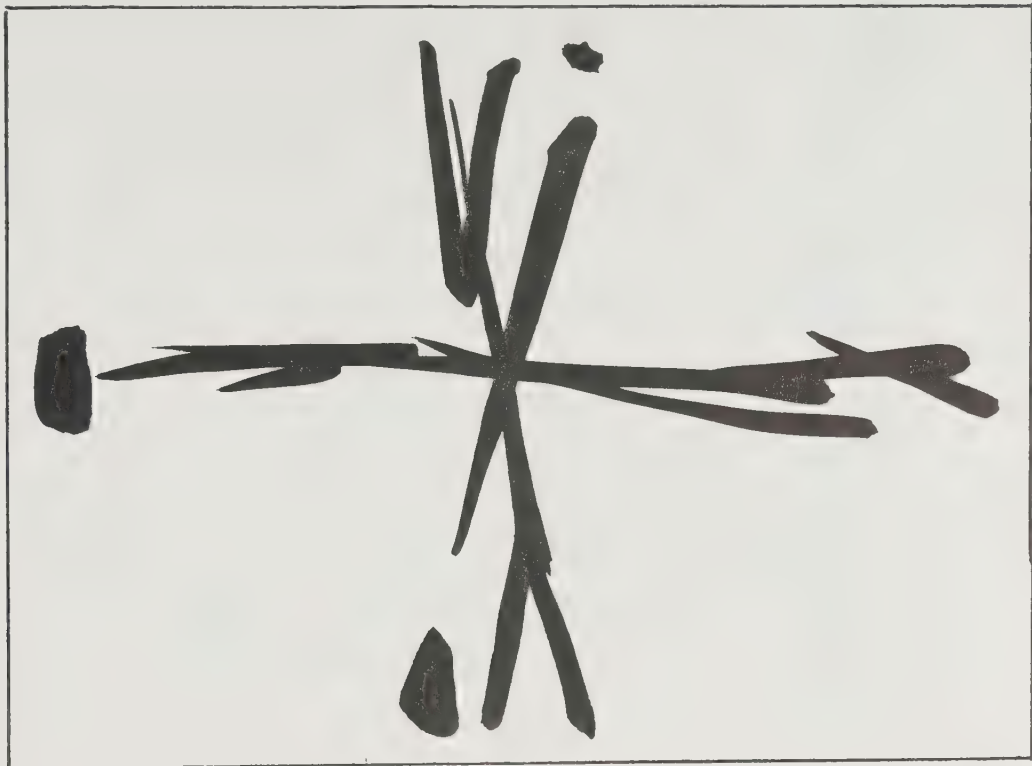


Fig. 6 - Branches, horizontal and vertical

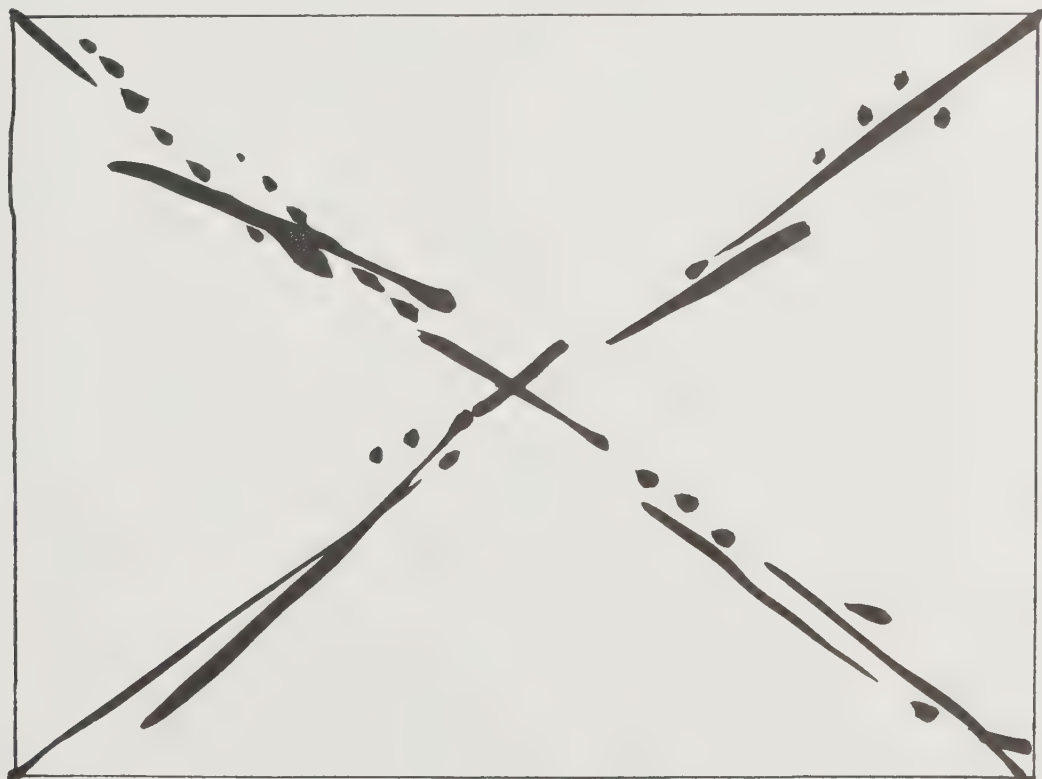


Fig. 7 - Branches, diagonal



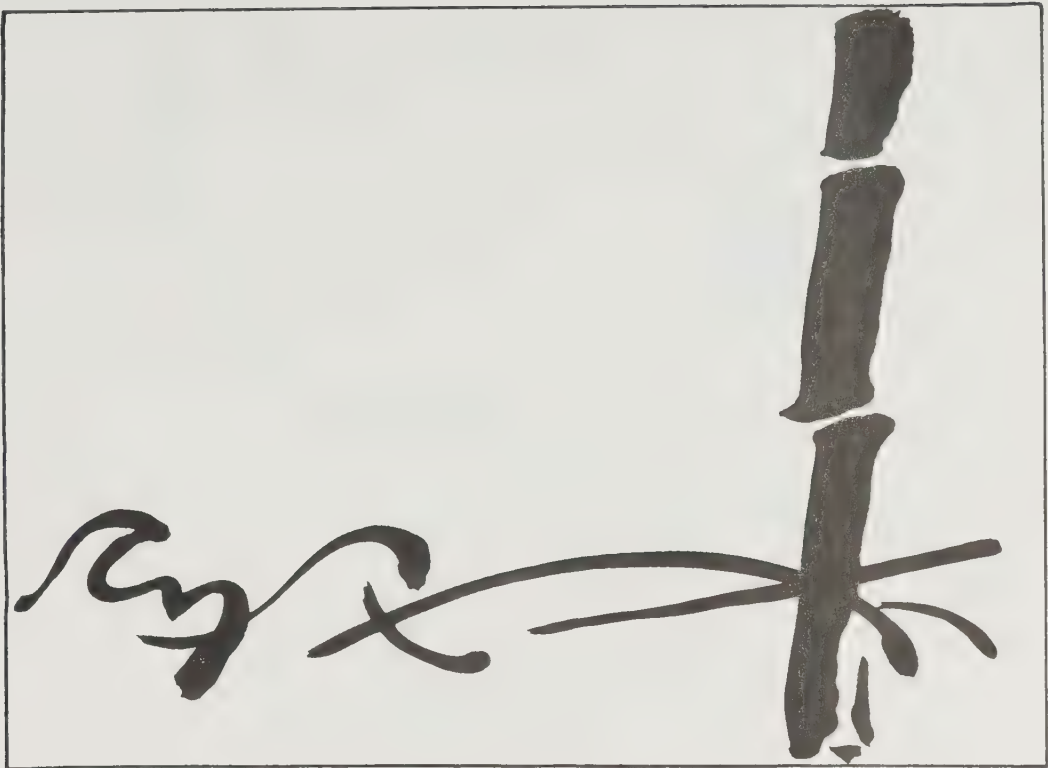


Fig. 8 - Division, horizontal - vertical

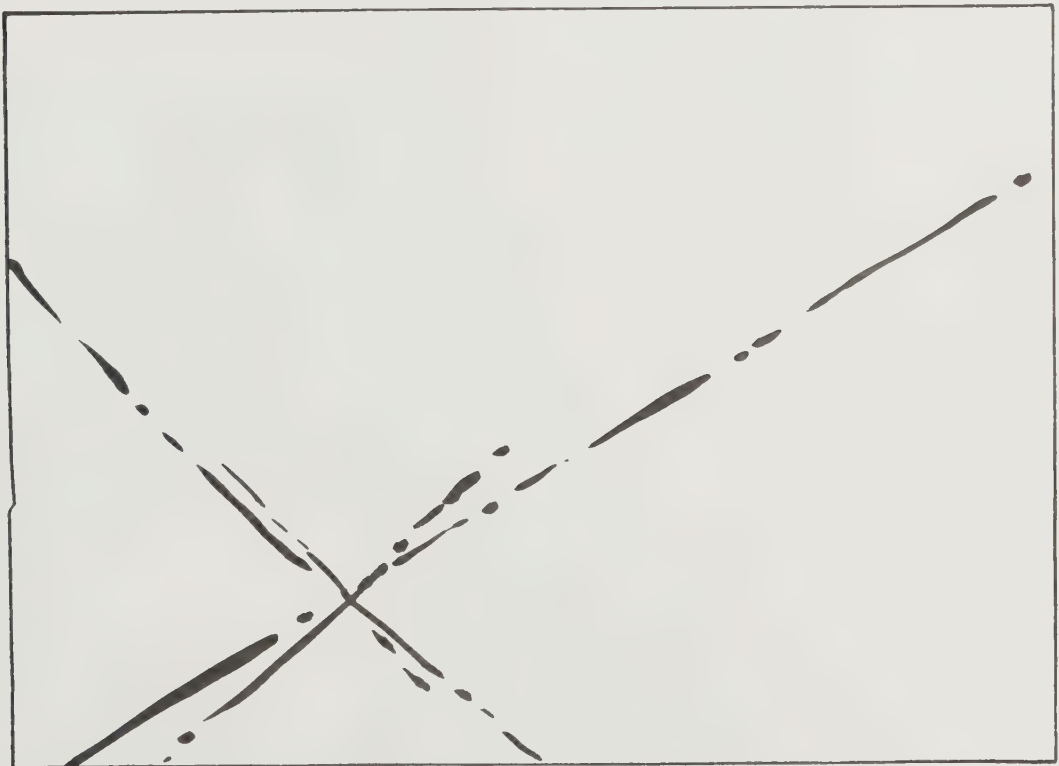


Fig. 9 - Division, diagonal





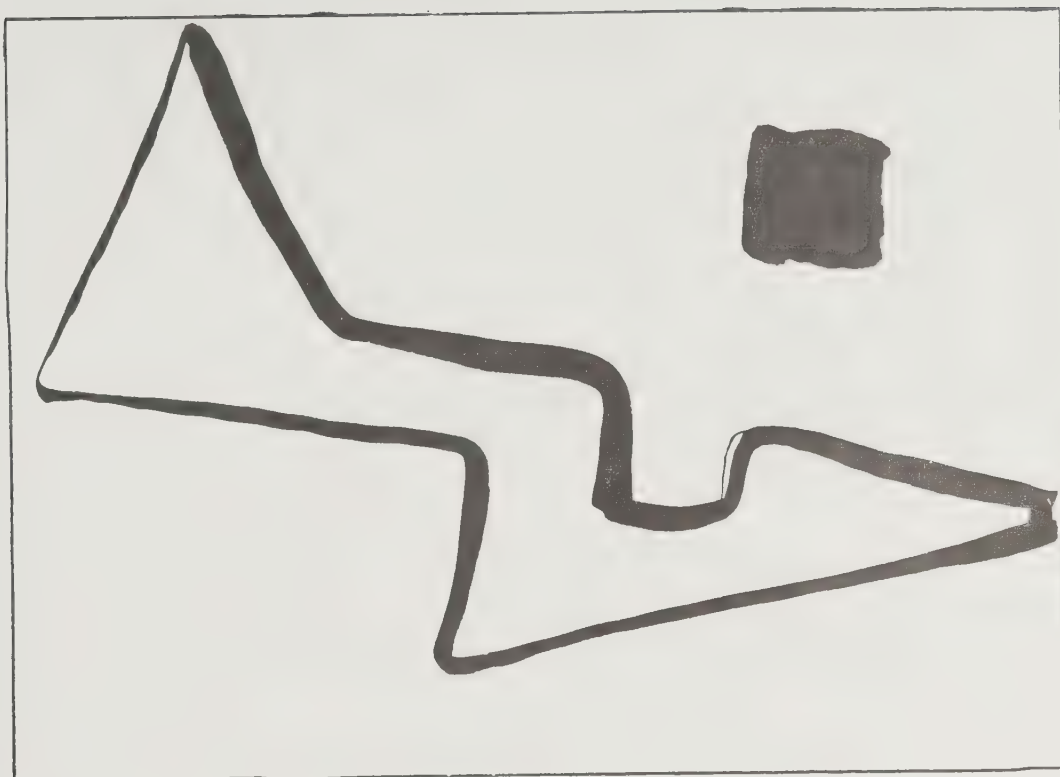


Fig. 10 - Two elements in off-centre balance

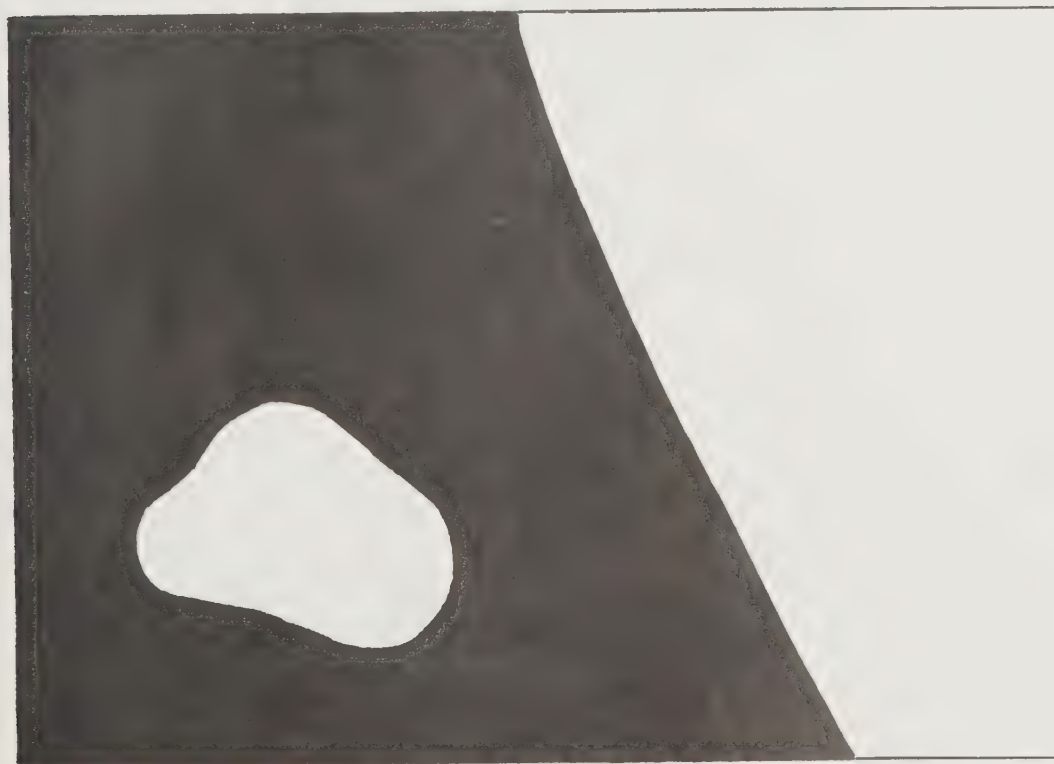


Fig. 11 - Three elements in off-centre balance



For all the following processes the first two steps are the same as illustrated in Figs. 1 and 2. The difference begins at the first stage of resist removal.

### Progressive Stop-out

In this method the process of resisting and dyeing is repeated for each colour in the design, and once resist has been applied to a particular area it stays throughout the entire process.

The cloth is progressively covered with more and more resist - to protect the parts of the cloth that have been dyed the desired colour. This process allows for a design containing only one pure primary colour - yellow, blue or red. After the second dyeing, the colour produced can only be a combination of the first and second baths - orange, green, violet, grey or brown, depending on the dyes used. The areas exposed to the third dye-bath will receive even more of a mixture.

The progressive stop-out method is well suited to designs in several shades of the same colour; and to designs in which shapes partially hide one another.

### The Process

The first application of the resist is to cover those parts of the cloth that are to keep the original colour throughout the entire process. Immerse cloth in first dye-bath. Allow to dry. Immerse in vinegar rinse. Drip dry. Immerse in cold water rinse. Allow to dry thoroughly.

The second application of the resist is to cover those parts of the dyed cloth that are to keep the colour of the first dye-bath. Immerse cloth in second dye-bath. Repeat drying and rinsing process as above.

The third application of resist is to those parts of the dyed cloth that are to keep the colour attained after the second dye-bath. Immerse cloth in third dye-bath. Repeat drying and rinsing process as above.

Although we have described only three dye-baths, the process may be continued if desired.

After the last dye-bath, the resist is removed for the first time and only then is the completed design revealed.

When making a design for progressive stop-out, it is wise to break the design into progressive stages on paper before starting on the cloth — along the lines illustrated in Figs. 12-18.

In the following illustrations the black represents the resist.



Fig. 12 - First application of resist - covered areas will keep the colour of the cloth

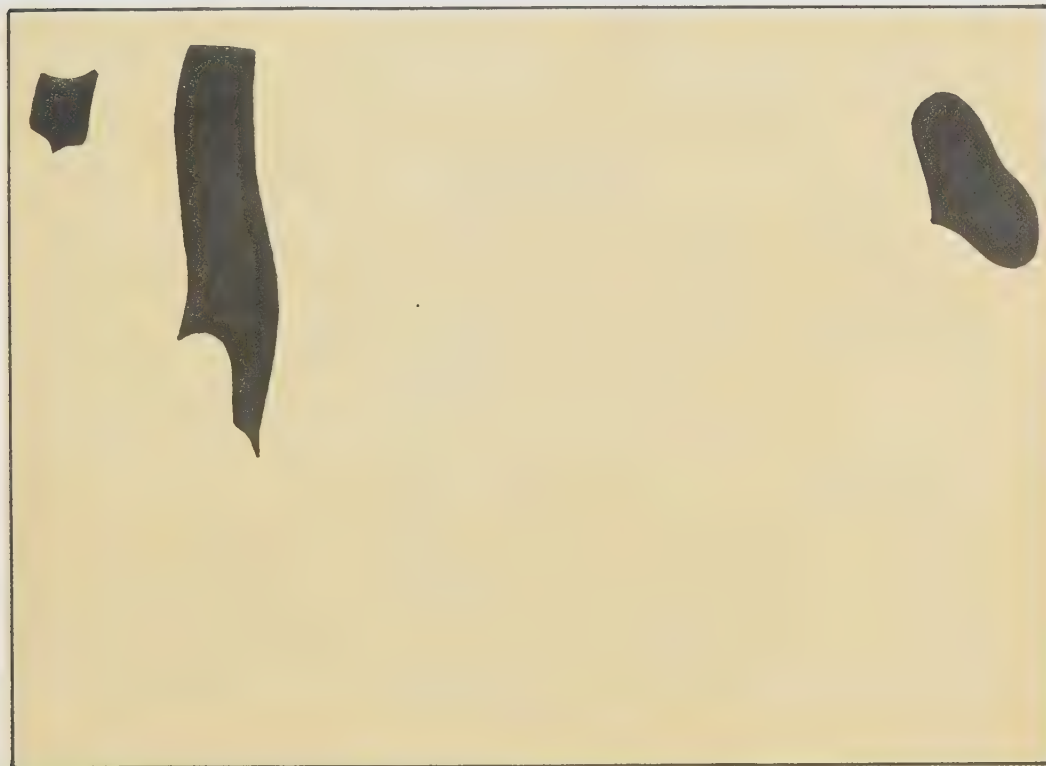


Fig. 13 - First dye-bath





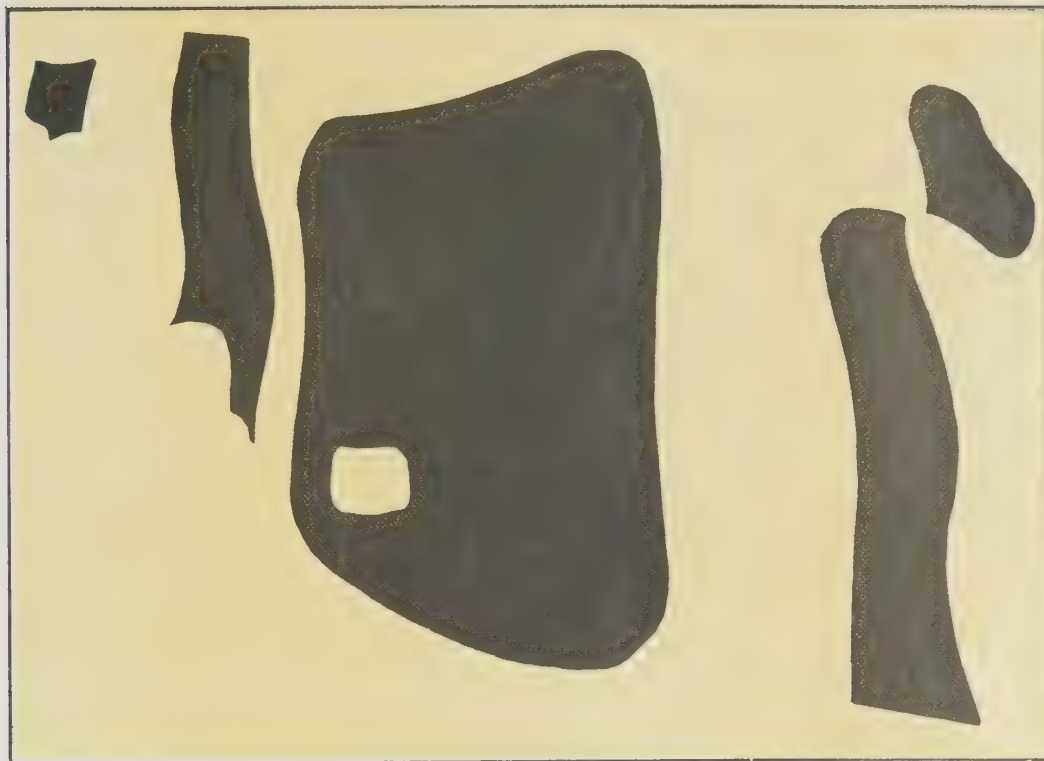


Fig. 14 - Second application of resist to those areas that will keep colour of first dye-bath

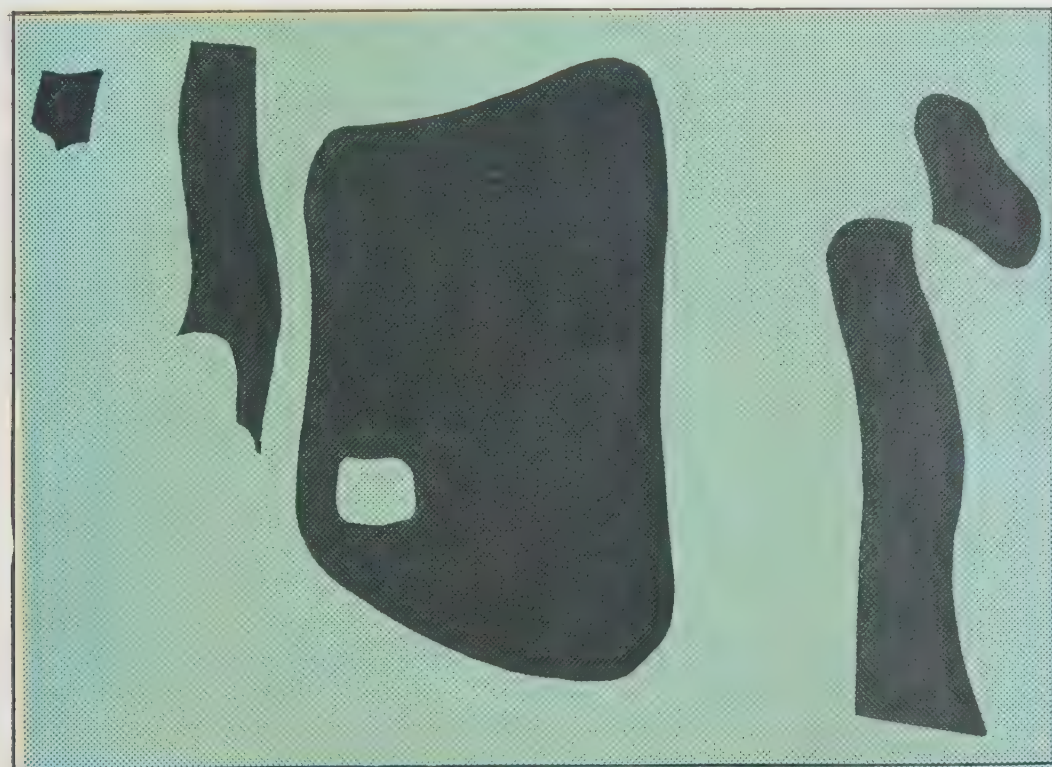


Fig. 15 - Second dye-bath



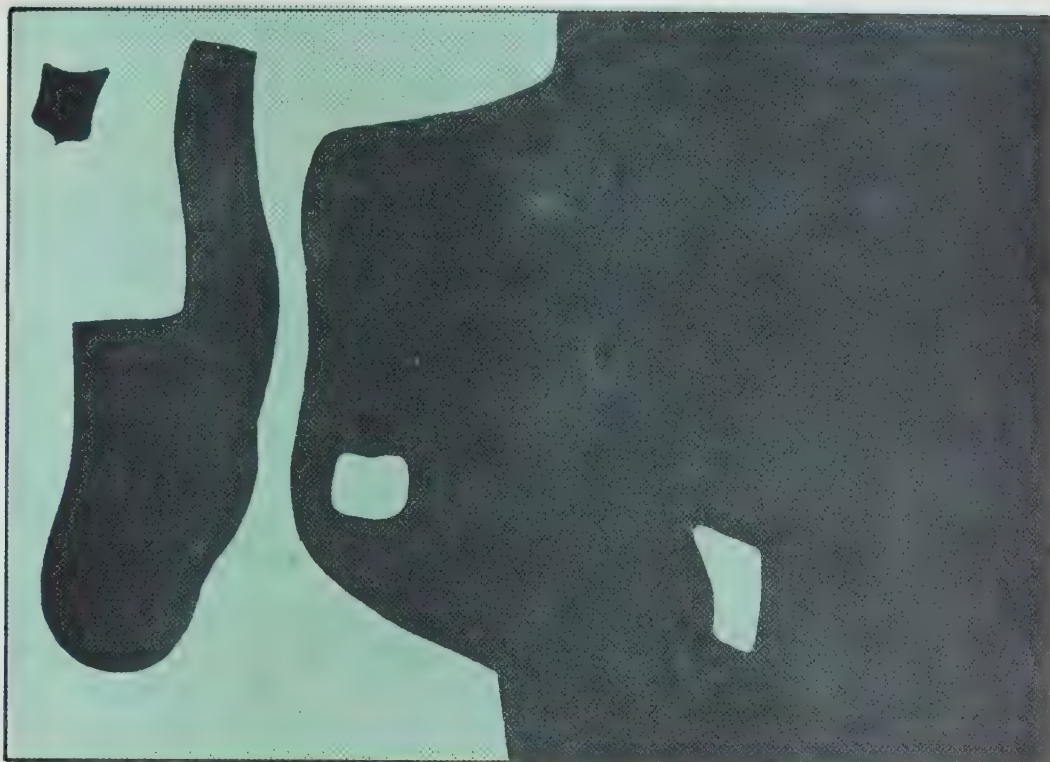


Fig. 16 - Third application of resist - to those areas that will keep the colour of the second dye-bath



Fig. 17 - Third dye-bath





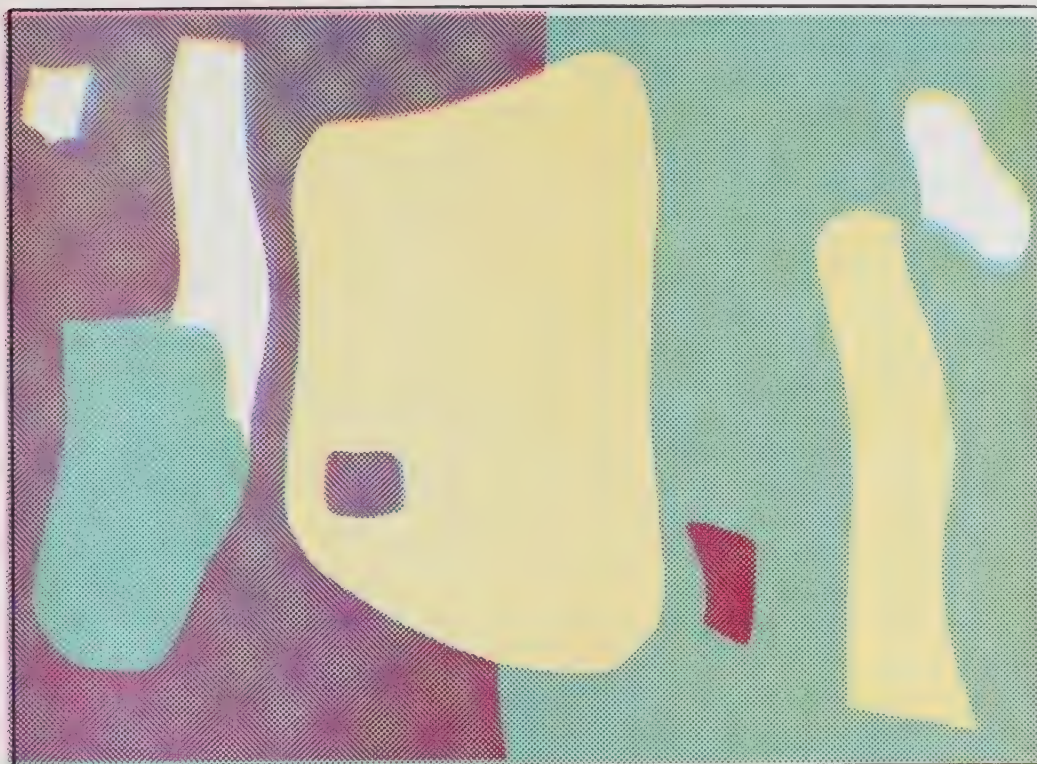


Fig. 18 - After the resist has been removed



## Transparency

In this method the process of resisting and dyeing is repeated for each colour in the design, but the resist is completely removed after each dye-bath. It is reapplied to cover areas previously resisted (or their parts), as well as parts of areas previously exposed. Thus the effect of transparency is produced.

This method takes fuller advantage of colour mixing. With only three dye-baths, eight colours can be produced. For instance, in yellow, blue and red dye-baths: green is produced where blue overlaps yellow; orange is produced where red overlaps yellow; violet is produced where red overlaps blue; brownish grey is produced where all three colours (yellow, blue, red) overlap; and white appears where the white cloth is allowed to keep its original colour.

## The Process

The first application of the resist covers those parts of the design where the original colour of the cloth is to be preserved, as well as the parts reserved for colours other than that of the following dye-bath and its mixtures. For example, if the first dye-bath is yellow, resist should be applied to all areas that are to remain white and all areas that are to become red, blue and violet. After the first dye-bath, allow to dry. Follow with a vinegar rinse and partial drying as before. The final rinse is in cold water.

Remove thoroughly all the resist. (For resist removal see page 7. )

The second application of the resist covers those parts that are to remain white, the parts reserved for red and orange (if your second dye-bath is blue) and the parts we want to stay yellow from the previous dye-bath. In the blue dye-bath, the white parts are dyed blue and the yellow parts are dyed green.

After the drying and rinsing process has been completed, remove once more all the resist thoroughly.

In our design the third dye-bath is red. Therefore the third application of the resist must cover all the parts that are white, yellow, green or blue in the final design. In the red dye-bath, the white parts are dyed red; the yellow parts are dyed orange; the blue parts are dyed violet; and the green parts are dyed brown or grey.

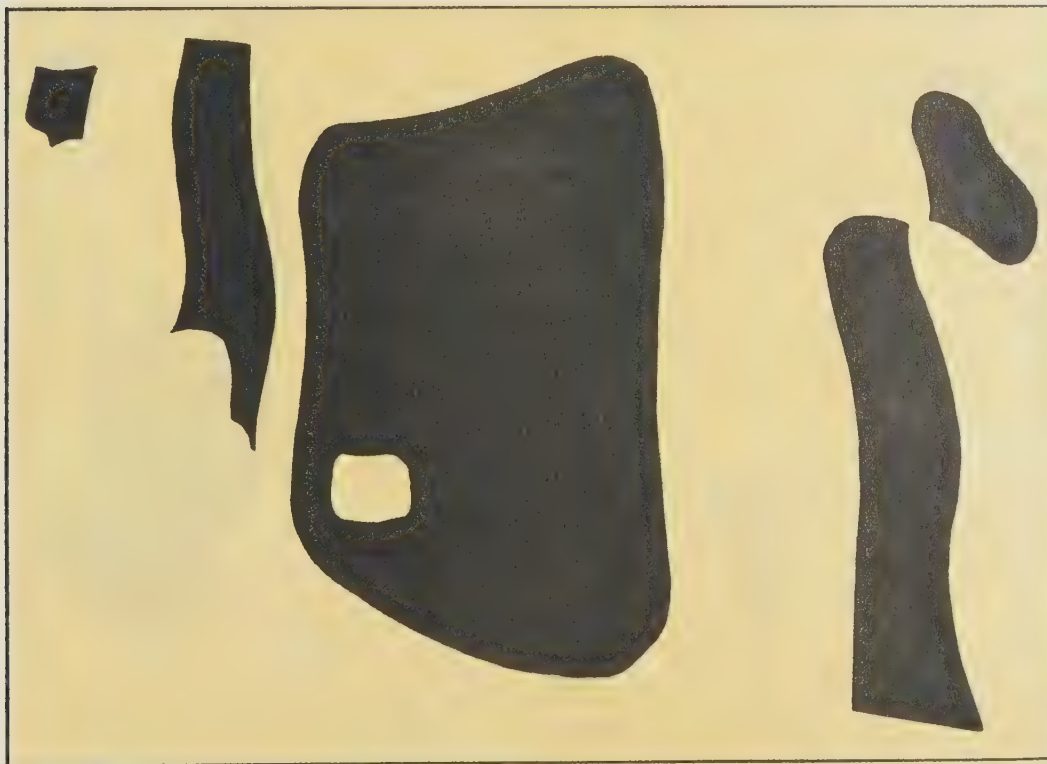
Follow once more the drying and rinsing process as described previously, then remove all the resist thoroughly.

Figs. 19-27 illustrate the transparency process. In each step the resisted areas are shown in black.





**Fig. 19** - First application of resist to protect some areas from the first dye-bath



**Fig. 20** - First dye-bath





Fig. 21 - First removal of resist

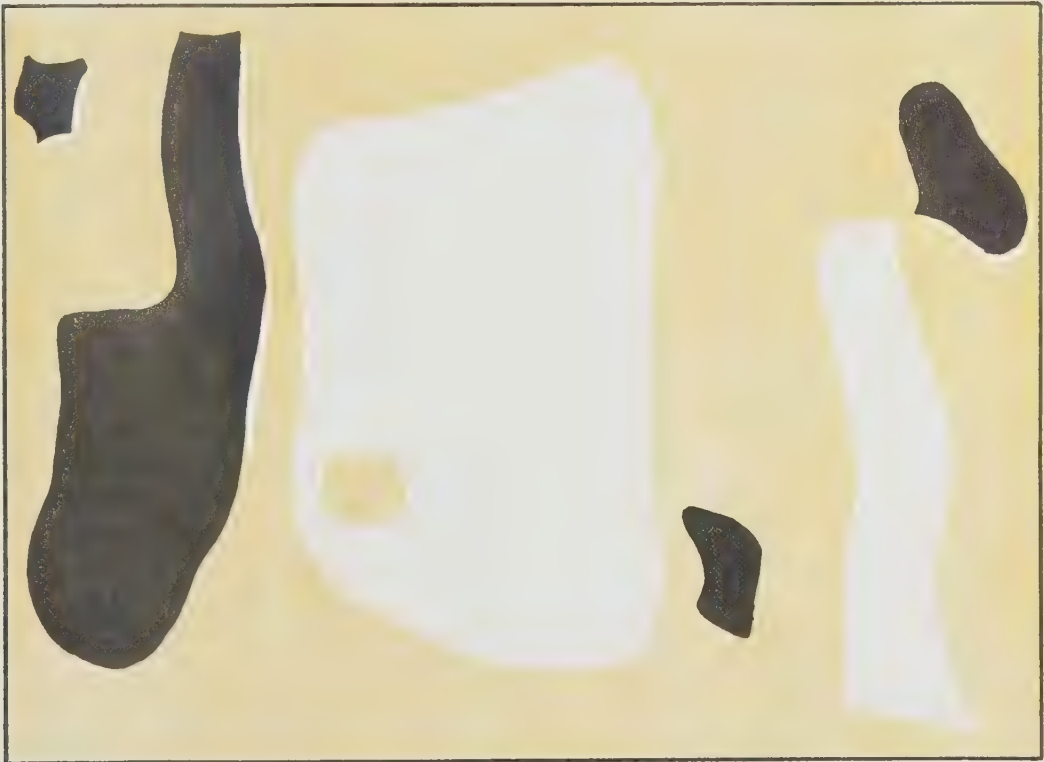


Fig. 22 - Second application of resist to protect the colour of the first dye-bath in some areas





Fig. 23 - Second dye-bath



Fig. 24 - Second removal of resist







Fig. 25 - Third application of resist

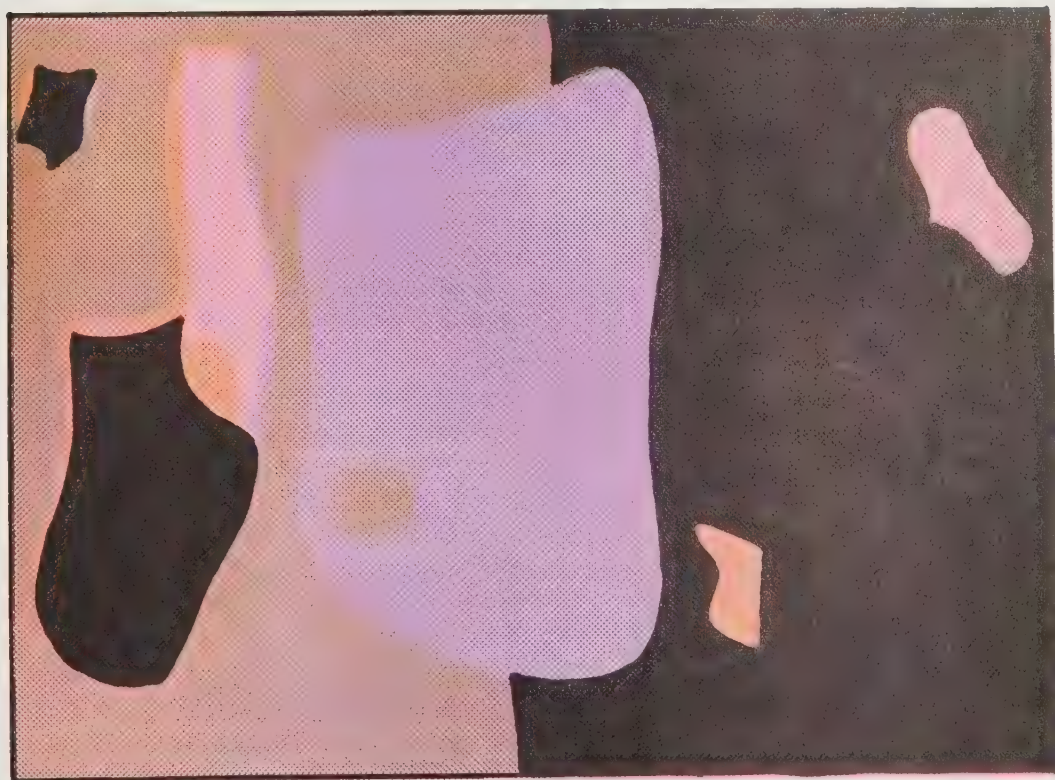


Fig. 26 - Third dye-bath



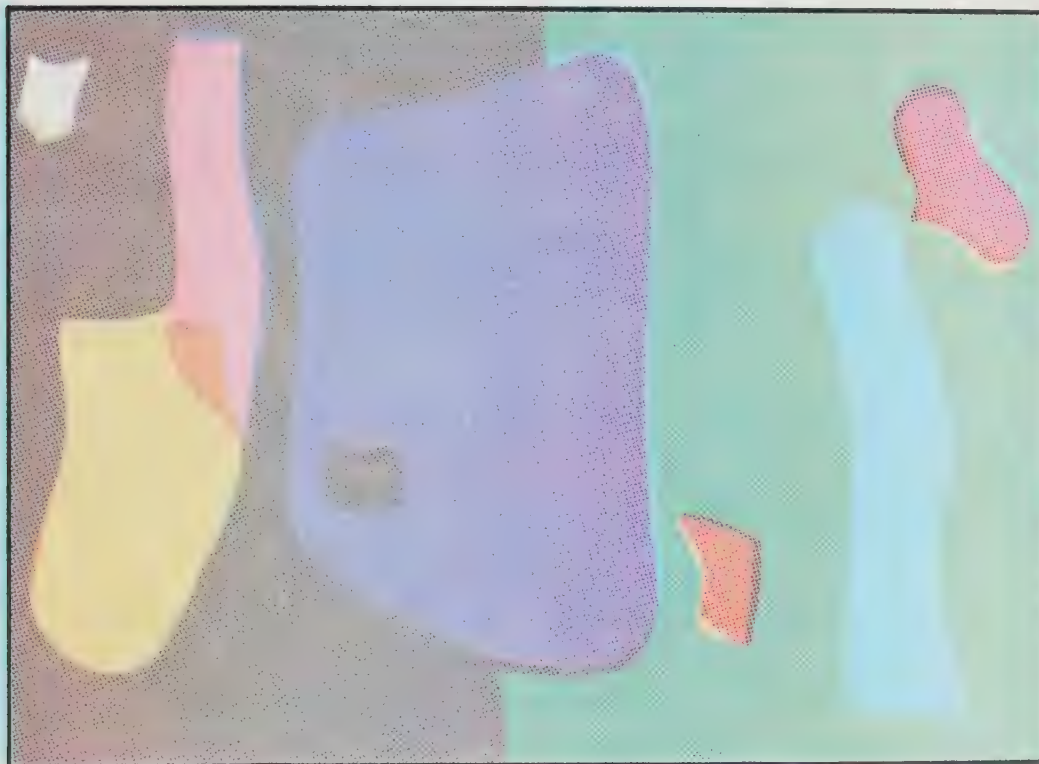


Fig. 27 - Final removal of resist



## Spot-dyeing

The spot-dyeing method is a combination of batik and painting. The areas to be subsequently dyed by hand are at first covered with the resist and then the cloth receives the first and only dye-bath. After thorough removal of the resist, the areas where dye is to be applied directly with the brush have to be carefully outlined with resist to prevent the dye from spreading beyond the shape desired.

Because of the nature of the process, cold water dyes are not suitable for spot-dyeing. Concentrated "direct" or garment dye is the only effective type of dye.

## The Process

Resist all the areas to be hand-dyed at a later stage.

Dye-bath.

Dry.

Remove all the resist thoroughly.

Outline with resist all the areas to be spot-dyed, keeping the resist outside the limits of the areas.

Apply dye with a brush or other tool. As many colours as desired may be used.

Remove the resist.

The dyes applied by hand should be more concentrated than when used in dye-bath (two cups instead of a gallon of liquid) and only a small quantity of salt is necessary.



## Problems and How to Solve Them

Design partially disappears: The resist was too cold when applied and did not penetrate the fibres, allowing the dye to enter through the underside of the fabric.

Design too scattered or too small: The size of the design was not considered properly in relation to the size of the cloth used. If the colour still allows for additional dye-baths, fill spaces (in case of scattered design) with additional patterns and re-dye in strong colour. If the design is too small, add a few more elements to the design. Re-dye as above.

Colour too weak: This occurs when the dye-bath is too watery. Unless the material is unsuitable for dyeing or the resist was not thoroughly removed, re-apply resist and repeat dye-bath of same colour but stronger solution. (This process provides opportunity for two-tone play.)

Design lost through heavy marbling: This is caused by excessive handling of the cloth in the dye-bath. The design may be resisted and given a dye-bath of considerably stronger (or darker) colour.

Colours too harsh: This may be remedied by resisting some of the bright areas and re-dyeing in a dye-bath of a colour complimentary to the dominant colour in the design.

Colours dead: The only remedy here is to resist the areas worth saving and follow with one or more dye-baths of a strong basic colour.

## Fabrics

Unbleached material dyes more effectively than bleached. Therefore it is recommended that unbleached cotton be used for first batiks. However, other types of materials are very well suited.

### Cotton

All cotton materials are suitable, providing they have not been specially treated to be crease- or stain-resistant or partially water-repellent.

### Silk

All types of pure silk materials are most suitable for both types of dyes. Fabrics of silk and cotton or silk and synthetics do not dye effectively.

### Wool

Wool may be used only with a direct dye.

### Linen

Linen is well suited for both direct and fibre-active dye. Linen blends should be avoided.

### Rayon viscose

This is the only synthetic fabric suited for both types of dyes.

Percal and shirting are to be avoided. Most of these materials are resin-treated to make them crease-resistant. As a result such materials do not absorb the dye.

Coloured cloth may be used instead of white when a particular effect is desired. In such a case only designs without white in them are suitable.

## Resists

Depending on the marbling effect desired, two, sometimes three, different kinds of wax are mixed and a resin may be added. The following are often used:

### Bees' wax

Mostly used mixed half-and-half with paraffin or another wax. Soft, tough. Melting point 145° - 150° F. Inexpensive when purchased in a large quantity.

### Carnauba wax

Very hard and brittle. Produces excellent marbling effect. Melting point 178° - 195° F.

### Ceresin

Ceresin is purified earth wax. Melting point 140°-175° F. Medium hard.

### Poly-Pale resin

This is a synthetic resin. Brittle, hard. Melting point 195° -212° F.

Tallow, oil or vaseline are used for softening and imparting suppleness to harder types of wax or wax mixtures.

## Salts

Salt is added to dye to encourage dye-absorption. Not all dyes require salt.

### Household salt

Household salt contains additives to keep it "running". These additives make accurate measuring rather difficult. In addition, salt is often iodized, which affects certain dyes.

### Ocean salt

Ocean salt is free of additives but contains some iodine.

### Rock salt

Rock salt is free of additives and free of iodine. It is best suited for use in dyeing.

### Direct dye

This type of dye is sometimes called garment dye. It is available in a large selection of colours, usually in one- or two-ounce packages, and is suited for most types of fabric.

Dye-baths prepared with direct dye should be kept near boiling point because high temperature is needed to make the dye penetrate the fibre properly and permanently. Regardless of the name given to the dye, when the instructions on the label tell you to simmer the garment in the dye-bath, you are dealing with a direct dye. Prepared as suggested on the label, the hot direct dye-bath is useless for batik dyeing because even the hardest wax would melt and the design disappear. For use in batik these dyes may be dissolved in boiling water, but then cold water must be added to increase the volume of the bath so that it will cover the cloth. Since high temperature helps colour to penetrate and remain in the fibre, bringing the temperature down weakens colour-fastness.

As a rule, batiks dyed with direct dyes should be dry-cleaned.

Direct dyes have some advantages. Dye uptake is instantaneous, the same dye-bath can be used over a period of time (several days), and no special knowledge or equipment are necessary. Also, direct dyes store well.

### Fibre-active dye

This type of dye is sometimes called cold water dye. It is the professional dye for cotton, silk, linen and celanese fabrics. Fibre-active dyes are quite colourfast. Chemicals are used instead of high temperature to make the dye penetrate and remain in the fibre. These characteristics make the fibre-active dyes best suited for batik-making.

The process involved is slightly more complicated. Since the dye in the dye-bath is active only for a limited time (40-60 minutes depending on the brand used), the various operations before and during the submersion of the batik in the dye-bath have to be well timed. Also, the dry batik has to be weighed, as do the dye and the additives. The colour range is limited (for example, black is not available), and whenever subtler shades are desired some knowledge of colour mixing is necessary. However, fibre-active dyes store well.

Removal of the resist is quite simple. After the batik has thoroughly dried, it is put into boiling water and boiled for 3-5 minutes. The resist forms a layer on the top of the water; it can be skimmed off and re-used. The batik may be washed with soap and warm water immediately after the removal process.

### Summary

The direct dyes are easier to use, but the fibre-active dyes are more permanent.

### Tools

Traditionally the hot resist is poured through an instrument, sometimes called a tjanting, a small cup with one or more spouts on the bottom and an insulated handle. Something similar to a one-spout tjanting can be made from a small oil-can. The body of the oil-can has to be punctured near the top to let air in. The resist is put into the can in pieces and melted over hot water. As the oil-can gets too hot to handle with bare hands, it has to be held with tongs. When the spout gets blocked with cooling resist, hold over a candle flame and it will clear in a few seconds. A brush may be used in combination with the

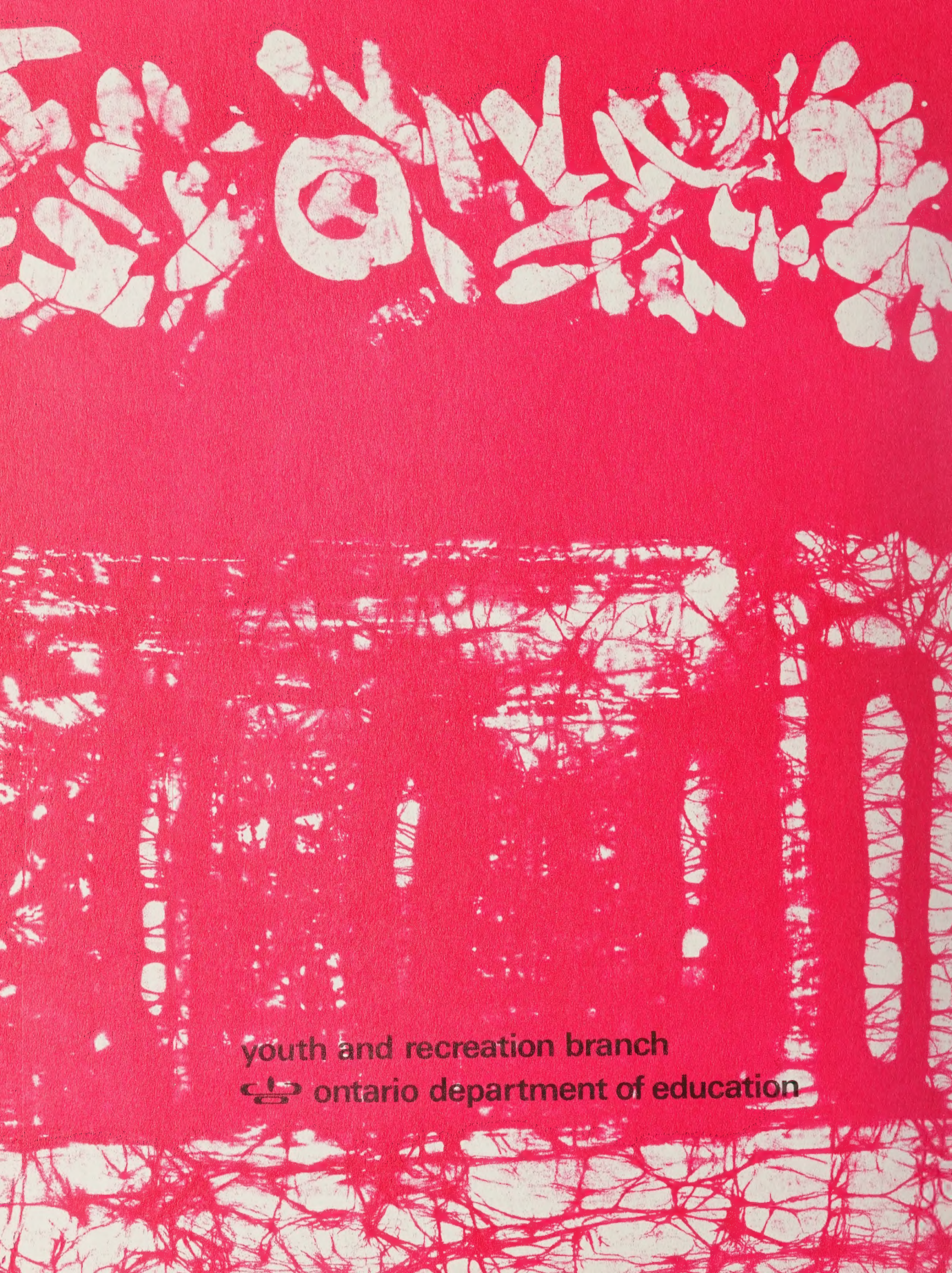
oil-can method to resist areas that require greater precision, or it may be used instead of the oil-can method if it seems more suitable. A little imagination will suggest many other tools that might be used to apply the resist, depending on the effect desired.











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